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Education

Johns Hopkins Hospital Department of Medicine Fellowship in Cardiology	1989-1992
Massachusetts General Hospital Department of Medicine Intern and Resident in Internal Medicine	1986-1989
Harvard Medical School Doctor of Medicine	1979-1986
Harvard University School of Arts & Sciences Doctor of Philosophy in Biophysics	1979-1986
University of Maryland Bachelor of Science, Physics	1975-1979

Professional Experience

Chief, Center for Molecular Medicine National Heart, Lung, and Blood Institute NIH	2010-present
Chief, Translational Medicine Branch National Heart, Lung, and Blood Institute NIH	2007-2010
Chief, Cardiology Branch National Heart, Lung, and Blood Institute NIH	2001-2007
Senior Investigator National Heart, Lung, and Blood Institute NIH	1998-2001

Investigator 2
1992-2008
National Heart, Lung, and Blood Institute
NIH

Academic Affiliation

Johns Hopkins School of Medicine 1998-present
Adjunct Associate Professor of Medicine

Certification and Licensure

American Board of Internal Medicine 1989-present
Internal Medicine

Licensure—State of Maryland 2000-present
D0058062

Administrative Experience

Management experience includes supervising NIH intramural research program consisting of approximately 150 physicians, scientists and support staff with an annual research budget of \$24 million.

Selected Honors and Awards

Summa Cum Laude 1979
Highest Honors in Physics 1979
MIT-Harvard Health Science and Technology Program 1979-1986
Medical Science Training Program 1980-1986
American Heart Association Louis N. Katz Basic Science Research Prize for Young Investigators—Finalist 1992
American Society for Clinical Research 2002
Ellison Medical Foundation Senior Scholar in Aging Award 2006-2010
Association of American Physicians 2009

Selected Committee Assignments and Administrative Services

NHLBI Technology Evaluation and Advisory Committee	1997-2001
NHLBI Molecular Genetics Advisory Group	1998-2002
NHLBI Internal Scientific Review Committee	2000-present
American Heart Association Louis N. Katz Basic Science Research Prize Selection Committee	2000-2003
NHLBI Promotions and Tenure Committee	2001-present
Institutional Review Board, NHLBI	2002-2003
American Heart Association Basic Science Leadership Council	2003-2005
Steering Committee for the NIH Bone Marrow Stromal Cell Transplantation Center	2010-present
NHLBI iPS Oversight Committee	2011-present

Patents

Efficient and Selective Adenoviral-Mediated Gene Transfer into Vascular Neointima Patent	Patent #6,682,728
Restenosis/Atherosclerosis diagnosis, prophylaxis and therapy	Patent #6,183,752
Method for the Diagnosis and Treatment of Vascular Diseases	Patent #7,708,977

Selected Oral Presentations (2004-present)

Duke University 7 th Annual Reves Lecture,Durham, NC	January 2004
Cardiovascular Cell and Gene Therapy Conference,Boston, MA	April 2004
Nobel Conference #46:Karolinska Institute,Stockholm, Sweden	June 2004
CellPress: Conference on Aging,Tuscany, Italy	December 2004
University of TurkuTUBS Symposium,Turku, Finland	June 2005
Buck Institute for Aging Research,Novato, CA	July 2005
University of Nebraska 3 rd Annual Redox symposium,Lincoln, NE	September 2005
CNIO Cancer and Aging,Madrid, Spain	November 2005
EMBO Workshop on Redox Signaling,Rome, Italy	April 2006
American Association for Cancer Research, Washington, DC	April 2006
American Association of Aging Meeting,Boston, MA	June 2006
American Diabetes Association,Washington, DC	June 2006
Gordon Conference on Thiol-Based Signaling,Biddeford, Maine	June 2006

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Society for Free Radical Research International,Davos, Switzerland Cold Spring Harbor Redox Dependent Signal Transduction Organizer, Cold Spring Harbor,NY	August 2006 December 2006
Johns Hopkins Hematology Grand Rounds, Baltimore, MD	April 2007
4 th Key Symposium of Aging,Stockholm, Sweden	September 2007
HHMI Meeting on Mitochondrial Function,Janelia Farms, VA	March 2008
The Harvard Glenn Symposium on Aging,Boston, MA	June 2008
Massachusetts General Hospital Cancer Center,Boston, MA	September 2008
Mechanisms of Adult Stem Cell Aging,Reisensburg, Germany	May 2009
John B. Little Symposium, Harvard School of Public Health, Boston, MA	October 2009
Organizer: The Energy of Cancer,Madrid, Spain	November 2009
Cardiology Grand Rounds, University of Chicago, Chicago, IL	February 2010
Cardiovascular Research Center, MGH, Boston, MA	May 2010
Broad Institute, MIT,Boston, MA	May 2010
Cold Spring Harbor Laboratory, Cold Spring Harbor, NY	December 2010
MD Anderson Cancer Center,Houston, TX	March 2011
University of Iowa:Distinguished Biomedical Scholar Lecture, Iowa City,IA	March 2011
Gordon Research Conference	June 2011

Selected Editorial Positions

Editor in Chief	
<i>Drug Discovery Today: Disease Mechanisms</i>	2003-present
Associate Editor	
<i>Circulation Research</i>	1999-2009
<i>Aging Cell</i>	2008-present
<i>Molecular Aspects of Medicine</i>	2009-present
Editorial Board	
<i>Nature Reviews Molecular Cell Biology</i>	2005-2011
Highlights Advisory Panel: <i>Circulation</i>	2000-2010
<i>Free Radical Research</i>	2001-2005
<i>Journal of Biological Chemistry</i>	2003-2005
<i>Antioxidants and Redox Signaling</i>	2003-present
<i>IUBMB Life</i>	2003-present
<i>Mechanisms of Ageing and Development</i>	2007-present
<i>Clinical and Translational Science</i>	2008-present
Books	
<i>Signal Transduction and Human Disease</i> , John Wiley Edited by T. Finkel and J.S. Gutkind	2003

Active Clinical Protocols

10-H0-0126: Characterization of Patients with Uncommon Presentations and/or Uncommon Diseases Associated with the Cardiovascular System

08-H-0210: Long term Follow up of Children and Adolescents Diagnosed with Hypertrophic Cardiomyopathy

07-HG-0002: ClinSeq: A Large-Scale Medical Sequencing Clinical Research Pilot Study

03-H-0282: Characterization of Cardiac Function in Subjects with Hereditary Hemochromatosis

95-H-0047: Diagnosis and Treatment of Patients with Heart and Vascular Disease

Publications

Finkel T. and Wolf D.P. (1980). Membrane potential, pH and the activation of surf clam oocytes. *Gamete Research* 3:299-304.

Finkel T., Levitan H., and E.J. Carroll Jr. (1981). Fertilization in the sea urchin arbaciapunctulata inhibited by fluorescein dyes: evidence for a plasma membrane mechanism. *Gamete Research* 4:219-229.

Finkel T. and Cooper G.M. (1984). Detection of a molecular complex between ras proteins and transferrin receptor. *Cell* 36:1115-1121.

Finkel T., Der C.J., and Cooper G.M. (1984). Activation of ras genes in human tumors does not affect localization, modification or nucleotide binding properties of p21. *Cell* 37:151-158.

Finkel T. (1985). The Biology and Biochemistry of Ras Proteins, Thesis, Harvard University.

Der C.J., Finkel T., and Cooper G.M. (1986). Biological and biochemical properties of human ras genes mutated at codon 61. *Cell* 44:167-176.

Carney W.P., Petit D., Hamer P., Der C.J., Finkel T., Cooper G.M., Lefebue M., Mobtaker H., Delellis R., Tischler A.S., Dayal Y., Wolfe H., and Rabin H. (1986). Monoclonal antibody specific for activated ras proteins. *Proc. Natl. Acad. Sci. U.S.A.* 83:7485-7489.

Fearon E.R., Finkel T., Gillison M., Tomaselli G., and Dang C.V. (1992). Karyoplasmic interaction selection strategy (KISS). A general method for detection of protein-protein interaction in mammalian cells. *Proc. Natl. Acad. Sci. U.S.A.* 89:7958-7962.

Finkel T., Duc J., Fearon E.R., Dang C.V., and Tomaselli G.F. (1993). Detection and modulation in vivo of helix-loop-helix protein-protein interactions. *J. Biol. Chem.* 268:5-8.

Guzman R.J., Lemarchand P., Crystal R.G., Epstein S.E., and Finkel T. (1993). Efficient and selective adenoviral-mediated gene transfer into areas of vascular injury. *Circulation* 88:2838-2848.

Epstein S.E., Speir E., and Finkel T. (1993). Do antisense approaches to the problem of restenosis make sense? *Circulation* 88:1351-1353.

Guzman R.J., Lemarchand P., Crystal R.G., Epstein S.E., and Finkel T. (1993). Efficient gene transfer into myocardium by direct injection of adenoviral vectors. *Circ. Res.* 73:1202-1207.

Finkel T., Theriot J.A., Tomaselli G.F., and Goldschmidt P.J. (1994). Dynamic actin structures are regulated by profilin. *Proc. Natl. Acad. Sci. U.S.A.* 91:1510-1514.

Speir E., Modali R., Huang E.S., Leon M., Shawl F., Finkel T., and Epstein S.E. (1994). Potential role of human cytomegalovirus and p53 interaction in coronary restenosis. *Science* 265;5170:391-394.

Irani K., Herzlinger S., and Finkel T. (1994). Ras proteins regulate multiple mitogenic pathways in A10 vascular smooth muscle cells. *BBRC* 202(3):1252-1258.

Epstein S.E., Speir E., Unger E.F., Guzman R.J., and Finkel T. (1994). The basis of molecular strategies for treating coronary restenosis following angioplasty. *JACC* 23:1278-1288.

Guzman R.J., Hirschowitz E.A., Brody S.L., Crystal R.G., Epstein S.E., and Finkel T. (1994). In vivo suppression of injury-induced vascular smooth muscle cell accumulation using adenovirus-mediated transfer of the herpes simplex thymidine kinase gene. *Proc. Natl. Acad. Sci. U.S.A.* 91:10732-10736.

Sundaresan M., Yu Z.-Y., Ferrans V.J., Irani K., and Finkel T. (1995). Requirement for generation of H₂O₂ for platelet-derived growth factor signal transduction. *Science* 270:296-299.

Finkel T. and Epstein S.E (1995). Gene therapy for vascular disease. *FASEB J.* 9:843-851.

Sundaresan M., Yu Z.Y., Ferrans V.J., Gutkind J.S., Irani K., Goldschmidt-Clermont P.J., and Finkel T. (1996). Rac1 regulates reactive oxygen species generation in fibroblasts. *Biochem. J.* 318(2):379-382.

Zhou Y.F., Leon M.B., Waclawiw M., Popma J.J., Yu Z.Y., Finkel T., and Epstein S.E. (1996). Prior infection with cytomegalovirus markedly increases the risk of restenosis following directional coronary atherectomy. *N. Engl. J. Med.* 335:624-630.

Johnson T.M., Yu Z.Y., Ferrans V.J., Lowenstein R.A., and Finkel T. (1996). Reactive oxygen species are downstream mediators of p53-dependent apoptosis. *Proc. Natl. Acad. Sci. U.S.A.* 93:11848-11852.

Crawford L.E., Milliken E.E., Irani K., Zweir J.L., Becker L.C., Finkel T., and Goldschmidt-Clermont P.J. (1996). Superoxide-mediated actin response in post-hypoxic endothelial cells. *J. Biol. Chem.* 43:26863-26867.

Epstein S.E., Speir E., Zhou Y.F., Guetta E., Leon M., and Finkel T. (1996).The role of infection in restenosis and atherosclerosis: focus on cytomegalovirus. *Lancet* 348:13-17.

Zhou Y.F., Guetta E., Yu Z.X., Finkel T., and Epstein S.E. (1996).Human cytomegalovirus increases oxidized LDL uptake and scavenger receptor mRNA expression in vascular smooth muscle cells. *J. Clin. Invest.* 98:2129-2138.

Sulciner D., Iran K., Yu Z.Y., Ferrans V.J., Goldschmidt P.J. and Finkel T. (1996).Rac1 regulates a cytokine-stimulated, redox-dependent pathway required for NF-KB activation. *Mol. Cell Biol.* 16:7115-7121.

Johnson T.M., Epstein S.E., and Finkel T. (1996).Apoptosis in vascular disease: Opportunities for genetic therapeutic intervention. *Seminars in Interv. Cardiol.* 1:195-202.

Moldovan N.I., Milliken E.E., Irani K., Chen J., Sohn R.H., Finkel T., and Goldschmidt-Clermont P.J. (1997).Regulation of endothelial cell adhesion by profilin. *Curr. Biol.* 7:24-30.

Irani K., Xia Y., Zweir J.L., Sollot S., Rosolowski L., Feason E.R., Sundaresan M., Finkel T., and Goldschmidt-Clermont P.J. (1997).Superoxide mediates mitogenic signaling in Ras-transformed fibroblasts. *Science* 275:1649-1652.

Harrell R.L., Rajanayagam M.A.S., Guzman R.J., Hirschowitz E.A., Crystal R.G., Epstein S.E., and Finkel T. (1997).Inhibition of vascular smooth muscle cell proliferation and neointimal accumulation by adenoviral-mediated gene transfer of cytosine deaminase. *Circulation* 96:621-627.

Moore K.A., Sethi R., Doanes A.M., Johnson T.M., Pracyk J.B., Kirby M., Irani K., Goldschmidt-Clermont P.J., and Finkel T. (1997).Rac1 is required for cell proliferation and G2/M progression. *Biochem. J.* 326:17-20.

Kim K-S., Kazuyo T., Tanaka K., Pracyk J.B., Yu Z-X., Ferrans V.J., Bruder J.T., Kovesdi I., Irani K., Goldschmidt-Clermont P., and Finkel T. (1998).Protection from reoxygenation injury by inhibition of rac-dependent pathways. *J. Clin.Invest.* 101:1821-1826.

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Finkel T. (1998). Oxygen Radicals and Signaling. *Current Opinion in Cell Biology* 10:248-253.

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Doanes A.M., Hegland D.D., Sethi R., Kovesdi I., Bruder J.T., and Finkel T. (1999). VEGF stimulates MAPK through a pathway that is unique for receptor tyrosine kinases. *Biochem. Biophys. Res. Comm.* 255:545-548.

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Tanaka K., Zou J.P., Takeda K., Ferrans V.J., Sandford G.R., Johnson T., Finkel T., and Epstein S.E. (1999). Effects of human cytomegalovirus immediate-early proteins on apoptosis in coronary artery smooth muscle cells. *Circulation* 99:1656-1659..

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Li A., Prasad A., Mincemoyer R., Satorius C., Epstein N., Finkel T., and Quyyumi A.A. (1999). The role of the C242T p22phox gene polymorphism in coronary artery disease and endothelial function. *Am. J. Med. Genet.* 86:57-61.

Li A.E., Ito H., Kim K.S., Takeda K., Yu Z.Y., Ferrans V.J., and Finkel T. (1999). The role of reactive oxygen species in anoikis. *Circ. Res.* 85:304-310.

Finkel T. (1999). Myocyte Hypertrophy: The Long and Winding RhoA'd. *J. Clin. Invest.* 103:1619-1620.

Zhou Y.F., Shou M., Guetta E., Guzman R., Unger E.F., Yu Z.X., Zhang J., Finkel T., and Epstein S.E. (1999). Cytomegalovirus infection of rats increases the neointimal response to vascular injury without consistent evidence of direct infection of the vascular wall. *Circulation* 100: 1569-1575.

Finkel T. (1999). Thinking Globally acting Locally, The Promise of Cardiovascular Gene Therapy. *Circ. Res.* 84:1471-1472.

Ito H., Rovira I.I., Bloom M.L., Takeda K., Ferrans V.J., Quyyumi A.A., and Finkel T. (1999). Endothelial progenitor cells as putative targets for angiostatin. *Cancer Res.* 59:5875-5877.

Hsich E., Segal B.H., Pagano P.J., Rey F.E., Paigen B., Deleonardis J., Hoyt R.F., Holland S.M., and Finkel T. (2000). Vascular effects following homozygous disruption of p47(phox)-An essential component of the NADPH oxidase. *Circulation* 101:1234-1236.

Xu D., Neville R., and Finkel T. (2000). Homocysteine accelerates endothelial cell senescence. *FEBS Lett.* 470:20-24.

Finkel T. and Sullivan D. (2000). Signal Transduction by Reactive Oxygen Species. *Signal Networks and Cell Cycle Control*, J. Silvo Gutkind ed., Humana Press, 365-377.

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Finkel T. (2000). Redox-dependent signal transduction. *FEBS Lett.* 476:52-54.

Sullivan D., Wehr N., Fergusson M., Levine R.L., and Finkel T. (2000). Identification of oxidant sensitive proteins: TNF- α induces protein glutathionylation. *Biochemistry* 39: 11121-11128.

Finkel T. and Holbrook N. (2000). Oxidants, Oxidative Stress and the Biology of Aging, *Nature* 408:239-247.

Sullivan D. and Finkel T. (2000). Adenoviral mediated expression of small GTPases. *Meth. In Enzym.* 325:303-314.

Ichida M. and Finkel T. (2001). Ras regulates NFAT3 activity in cardiac myocytes. *J. Biol. Chem.* 276:3524-3530.

Finkel T. (2001). Reactive Oxygen Species and Signal Transduction. *IUBMB Life* 52:3-6.

Xu D., Rovira I.I., and Finkel T. (2002). Oxidants painting the cysteine chapel: Redox regulation of PTPs. *Dev. Cell* 2:251-252.

Nemoto S. and Finkel T. (2002). Redox regulation of forkhead proteins through a p66shc-dependent signaling pathway. *Science* 295:2450-2452.

Savitsky P. and Finkel T. (2002). Redox regulation of Cdc25C. *J. Biol. Chem.* 277:20535-20540.

Sullivan D., Levine R., and Finkel T. (2002). Detection and Affinity Purification of Oxidant Sensitive Proteins Using Biotinylated Glutathione Ethyl Ester. *Meth. In Enzym.* 353:101-113.

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Xu D. and Finkel T. (2002). A role for mitochondria as potential regulators of cellular life span. *Biochem. Biophys. Res. Comm.* 294:245-248.

Mills E.M., Xu D., Fergusson M.M., Coombs C.A., Xu Y., and Finkel T. (2002). Regulation of cellular oncosis by uncoupling protein 2. *J. Biol. Chem.* 277:27385-27392.

Rovira I.I. and Finkel T. (2002). Surviving an Aerobic Environment: Aging under oxidative stress. *Geriatric Times* 3:19-22.

Ichida M., Nemoto S., and Finkel T. (2002). Identification of a specific molecular repressor of the peroxisome proliferator-activated receptor gamma coactivator-1 alpha. *J. Biol. Chem.* 277:50991-50995.

Hill J.M., Zalos G., Halcox J.P.J., Schenke W.H., Walclawiw M.A., Quyyumi A.A., and Finkel T. (2003). Circulating Endothelial Progenitor Cells, Vascular Function, and Cardiovascular Risk. *New England J. Med.* 348:593-600.

Finkel T. (2003). Neutrophils with a license to kill. Permeabilized, Not Stirred. *Dev. Cell* 4:146-148.

Finkel T. (2003). Oxidant Signals and Oxidative Stress. *Current Opinions in Cell Biology* 15:247-254.

Finkel T. (2003). A Toast to Long Life. *Nature* 425:132-133.

Mills E.M., Banks M.L., Sprague J.E., and Finkel T. (2003). Uncoupling Agony from Ecstasy. *Nature* 426:403-404.

Nemoto S. and Finkel T. (2004). Ageing and the mystery at Arles. *Nature* 429:149-152.

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Nemoto S., Fergusson M., and Finkel T. (2004). Nutritional stress links forkhead proteins to SIRT1. *Science* 306:2105-2108.

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Khakoo A. and Finkel T. (2005). Endothelial Progenitor Cells, *Ann. Rev. Med.* 56:79-101.

Balaban R., Nemoto S., and Finkel T. (2005). Mitochondria, Oxidants and Aging, *Cell* 120:483-495.

Nemoto S., Fergusson M.M., and Finkel T. (2005). SIRT1 functionally interacts with the metabolic regulator and transcriptional coactivator PGC-1 α . *J. Biol. Chem.* 280:16456-60.

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- Colavitti R. and Finkel T. (2005). Reactive oxygen species as mediators of cellular senescence. *IUBMB Life* 57:277-282.
- Liu H., Colavitti R., Rovira I.I., and Finkel T. (2005). Redox-dependent transcriptional regulation, *Circ. Res.* 97:967-974.
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- Finkel T., Vijg J., and Shay J.W. (2006). Time, tumours and telomeres. Meeting on Cancer and Aging. *EMBO Rep.* 7:479-483.
- Wang C., Chen L., Hou Z., Li Z., Kabra N., Ma Y., Nemoto S., Finkel T., Gu W., Cress W.D., and Chen J. (2006). Interactions between E2F1 and SirT1 regulate apoptotic response to DNA damage. *Nature Cell Biol.* 8:1025-31.
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- Finkel T. (2006). Intracellular redox regulation by the family of small GTPases. *Antioxid. Redox Signal.* 8:1857-1863.
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- Finkel T. (2006). Cell Biology: A clean energy programme. *Nature* 444:151-152.
- Liu C. and Finkel T. (2006). Cancer Gets the Chk'ered Flag. *Nature Medicine* 12:1354-1356.
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- Lu T. and Finkel T. (2008). Free radicals and senescence. *Experimental Cell Research* 314:1918-1922.
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